

# Bredbandsstöd, tågtäckning VGR

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# PTS Översikt VGR

2022 & 2024

- **2022** - Byggnation pågår
  - Lerum(42HP)
  - Mölndal (36HP)
  - Stenungsund (90HP) (21HP)
- **2024** - Beviljad tilldelning
  - Lerum(33HP)
  - Tjörn (57HP)



# Tågtäckning – möjligheter och utmaningar

# Innehåll

- Marknaden och aktörer
- Täckningskrav
- Framtidens tågradio - FRMCS
- Telias utbyggnadsmål

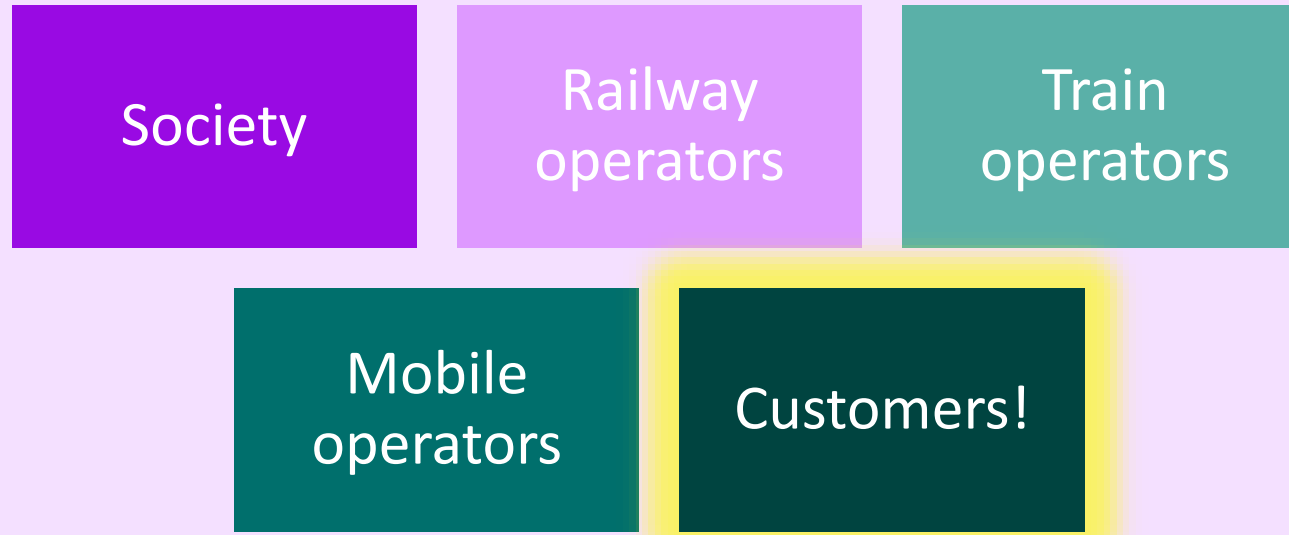


# Why is railway coverage important?

- Railway transportation is important and will be even more important in the future
  - Agenda 2030, Goal 11.2: AFFORDABLE AND SUSTAINABLE TRANSPORT SYSTEMS
- Railway passenger traffic is increasing by 8% yearly (at least up to the pandemic)
  - We can expect that train travel will continue to increase as it is an environmentally friendly alternative
- Our customers' demands and expectations are rising



# Railway coverage – the landscape



Distribution of roles in the market:

1. Outdoor coverage – Mobile Network Operators
2. On train coverage – Train operators
3. Tunnel (infrastructure) coverage – Railway operator (TRV)

**Challenges:**

- Still no formal assignment and budget to TRV
- “Railway route” centric implementation – customer focus!



# COMMUNICATION TO AND FROM TRAINS

Communication to and from trains can be divided into three categories:

**Mission critical communication**

— **Mission critical communication** (train radio function)

**Business critical communication**

— **Business critical communication**

— Communication needs for monitoring, operation and maintenance of trains and infrastructure

**Passenger communication**

— **Passenger communication**

**Possibility: Solving the right problem – take a broad view!**

\* Voice communication between train and traffic management.

Railway features: group calls, railway emergency calls, LDA (Location dependent addressing), functional numbers, preemption.



# Auction outcome

Bidder	Frequency and band	Cost per frequency band (SEK)
Telia Sverige AB	2×15 MHz, 900 MHz	833 176 563
	2×20 MHz, 2.1 GHz	190 468 456
	2×30 MHz, 2.6 GHz	528 815 766
		1 552 460 785
Hi3G Access AB	2×10 MHz, 900 MHz	701 564 274
	2×20 MHz, 2.1 GHz	190 468 456
	2×10 MHz and 40 MHz (TDD), 2.6 GHz	319 471 922
		1 211 504 652
Net4Mobility HB	2×10 MHz, 900 MHz	755 451 044
	2×20 MHz, 2.1 GHz	190 468 456
	2×30 MHz, 2.6 GHz	528 815 766
		1 474 735 266

## Licensing period

- 900 MHz: 23 years (eoy 2048)
- 2100/2600 MHz: 25 years (eoy 2050)

## Coverage obligations

- Railways: Telia, N4M, Hi3G
- Identified “white spots”: Telia

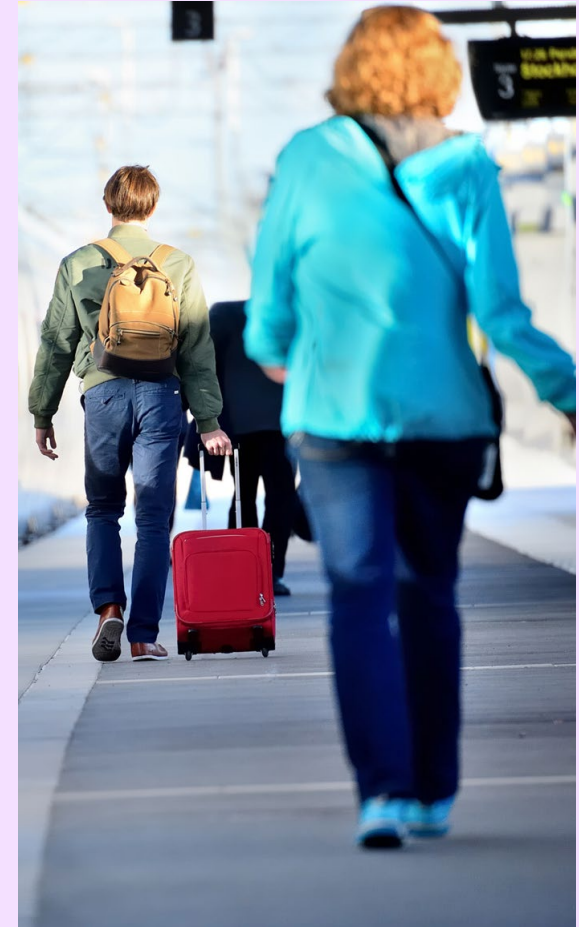




# Coverage obligations as a tool for extended railway coverage

- Coverage in general (including along railways) is a competitive tool among operators
- When PTS introduced mandatory coverage requirements for all operators in the latest auction, they directly interfered with the market, leading to unfortunate consequences:
  - Not automatically lower license fees
  - The result is that investments are shifted from other areas
- When, as was also the case with coverage requirements along the railway in 2022, the quality level was also regulated to 'VERY GOOD', the authority takes on the role of knowing what customers need and are willing to pay for.
  - This risks leading to overinvestments

**Challenge:** If coverage requirements are to be included at all in connection with spectrum auctions, they should encourage new investments



*FRMCS is the future system system for operational railway communication aiming to replace the current system, GSM-R, throughout Europe by 2030*



# COMMUNICATION TO AND FROM TRAINS

Communication to and from trains can be divided into three categories:

FRMCS

Mission critical communication

- **Mission critical communication** (train radio function)
  - Voice communication\*
  - ERTMS (signalling system)
  - ATO (Automatic Train Operation)

Business critical communication

- **Business critical communication**
  - Communication needs for monitoring, operation and maintenance of trains and infrastructure

Passenger communication

- **Passenger communication**

\* Voice communication between train and traffic management.

Railway features: group calls, railway emergency calls, LDA (Location dependent addressing), functional numbers, preemption.

# FRMCS allocated frequency bands


FRMCS has been allocated two frequency bands harmonized for use, the so-called RMR bands (Railway Mobile Radio, which is CEPT's designation for FRMCS).

- 900 MHz 5 MHz FDD 874,4-880 MHz, 919,4-925 MHz
- 1900 MHz 10 MHz TDD 1900-1910 MHz

Challenge: High output power from RMR at 1900 MHz risks severely affecting the ability to use the 2100 MHz band along the railways (up to several kilometers)



# SCENARIO MATRIX

		Network	
		MNO network	Dedicated TRV network
Spectrum	Commercial spectrum (700, 800, 900, 1800, 2100, 2600 MHz)	Scenario 1	#N/A
	Dedicated spectrum (1900 MHz)	Scenario 2	Scenario 3

Possibility: Scenario 1 would avoid the need of using 1900 MHz (and related potential interference into 2100 MHz band) i Sweden but implies full coverage along the railway network



# Telia 5G coverage 2024-10-30



- Coverage end of 2024
  - Population coverage 95%
  - Area coverage 45%
- Planned coverage end of 2025
  - Population coverage 99,9%
  - Area coverage > 90%
- Most railways already covered today, but still some gaps
  - Capacity on high passenger railways
  - Coverage on low passenger/cargo railways



# Railway coverage - Telia ambition

*Telia have the ambition to achieve a continuous coverage, with sufficient capacity, along all public railways before end of 2030*

*The implementation of identified gaps will start beginning of 2025*



# Summary and conclusion

- The market roleplay is fundamentally agreed upon between market actors
- The government has an opportunity to stimulate the expansion of railway coverage by, as far as possible, procuring communication services from MNOs instead of building its own networks.
- Coverage obligations intended for all operators could lead to reduced expansion in other areas
- Telia's plan is to ensure continuous coverage with sufficient capacity across the entire public railway network by 2030.
- There are still challenges that could seriously affect the timeline and scope of the expansion:
  - No clear assignment and budget allocated to TRV for coverage in tunnels and cuttings
  - Interference from FRMCS-1900 MHz into 2100 MHz.
- Regions/municipalities can contribute by:
  - Indoor coverage on trains (if train operator) and co-ordinate with other market players
  - Facilitating building permit processes and power supply connections



**TACK!**

